SAFETY DATA SHEET
Ammonia solution 24.9%

SECTION 1: Identification of the substance/mixture and of the company/undertaking

Date issued 05.02.2014

1.1. Product identifier
Product name Ammonia solution 24.9%
Chemical name Amonium hydroxide
Synonyms Ammonia solution, ammonia water
CAS no. 1336-21-6
EC no. 215-647-6
Index no. 007-001-01-2
Article no. 15250100

1.2. Relevant identified uses of the substance or mixture and uses advised against
Use of the substance/preparation Cleaning agent. Corrosion inhibitor. Water treatment material. Glue. NOx-reducer. (NOx Reduction.)

1.3. Details of the supplier of the safety data sheet
Manufacturer
Company name Fred Holmberg & Co AB
Office address Geijersgatan 8
Postal address Box 60056
Postcode S-216 10
City Limhamn
Country Sweden
Tel +46 (0)40 15 79 20
Fax +46 (0)40 16 22 95
E-mail info@holmberg.se
Website http://www.holmberg.se/en/

1.4. Emergency telephone number
Emergency telephone 112 (Europe)

SECTION 2: Hazards identification

2.1. Classification of substance or mixture
Classification according to 67/548/EEC or 1999/45/EC C; R34
Classification according to Regulation (EC) No 1272/2008 [CLP/GHS] Skin Corr 1B; H314;
STOT SE3; H335;

2.2. Label elements
Hazard Pictograms (CLP)

Signal word Danger
Hazard statements H314 Causes severe skin burns and eye damage.
Precautionary statements

P260 Do not breathe dust/fume/gas/mist/vapours/spray.
P264 Wash thoroughly after handling.
P271 Use only outdoors or in a well-ventilated area.
P280 Wear protective gloves/protective clothing/eye protection/face protection.
P301 + P330 + P331 IF SWALLOWED: rinse mouth. Do NOT induce vomiting.
P303 + P361 + P353 IF ON SKIN (or hair): Remove/Take off immediately all contaminated clothing. Rinse skin with water/shower. P363 Wash contaminated clothing before reuse.
P304 + P340 IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing. P310 Immediately call a POISON CENTER or doctor/physician.
P305 + P351 + P338 IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
P403 + P233 Store in a well-ventilated place. Keep container tightly closed.
P405 Store locked up.
P501 Innehållet/behållaren lämnas till destruktionsanläggning

2.3. Other hazards

Other hazards

Not known.

SECTION 3: Composition/information on ingredients

3.2. Mixtures

<table>
<thead>
<tr>
<th>Substance</th>
<th>Identification</th>
<th>Classification</th>
<th>Contents</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ammonia ...%</td>
<td>CAS no.: 1336-21-6</td>
<td>C; R34</td>
<td>24,9 %</td>
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<tr>
<td></td>
<td>EC no.: 215-647-6</td>
<td>N; R50</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Index no.: 007-001-01-2</td>
<td>Skin Corr. 1B;</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>H314 Aquatic Ac</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Acute 1; H400</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Note : B</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Column headings

CAS no. = Chemical Abstracts Service; EU (Einecs or Elincs number) = European inventory of Existing Commercial Chemical Substances; Ingredient name = Name as specified in the substance list (substances that are not included in the substance list must be translated, if possible). Contents given in: %, %wt/wt, %vol/wt, %vol/vol, mg/m3, ppb, ppm, weight%, vol%

HH/HF/HE

T+ = Very toxic, T = Toxic, C = Corrosive, Xn = Harmful, Xi = Irritating, E = Explosive, O = Oxidizing, F+ = Extremly flammable, F = Very flammable, N = Environmental hazard

Description of the mixture

Substance specific concentration limit - self classification for main constituent: Ammonia solution> 25% should be classified Aquatic Acute 1; H400. Our solution contains ≤ 24.9% and is therefore not classified Aquatic Acute 1; H400.

SECTION 4: First aid measures

4.1. Description of first aid measures

Inhalation

Move the exposed person to fresh air at once. If respiratory problems, artificial respiration/oxygen. Get medical attention if any discomfort continues.

Skin contact

Remove contaminated clothes and rinse skin thoroughly with water. Get medical attention immediately!

Eye contact

Immediately flush with plenty of water for up to 15 minutes. Remove any contact lenses and open eyes wide apart. To hospital or eye specialist.

Ingestion

NEVER MAKE AN UNCONSCIOUS PERSON VOMIT OR DRINK FLUIDS! Do NOT induce vomiting. Rinse mouth with water. Get medical attention immediately!
4.2. Most important symptoms and effects, both acute and delayed
Information for health personnel Treat symptomatically. Do not give victim anything to drink if he is unconscious.

4.3. Indication of any immediate medical attention and special treatment needed
Specific details on antidotes No recommendation given.

SECTION 5: Firefighting measures

5.1. Extinguishing media
Suitable extinguishing media Extinguish with alcohol-resistant foam, carbon dioxide, dry powder or water fog.

Improper extinguishing media Do not use water jet as an extinguisher, as this will spread the fire.

5.2. Special hazards arising from the substance or mixture
Fire and explosion hazards FLAMMABLE. Vapours are heavier than air and may spread near ground to sources of ignition. Solvent vapours may form explosive mixtures with air.

Hazardous combustion products Fire creates: Carbon monoxide (CO). Carbon dioxide (CO2).

5.3. Advice for firefighters
Fire fighting procedures No specific fire fighting procedure given.

SECTION 6: Accidental release measures

6.1. Personal precautions, protective equipment and emergency procedures
Personal protection measures Ensure suitable personal protection (including respiratory protection) during removal of spillages in a confined area. Ventilate well. Stop leak if possible without risk. Avoid contact with skin and eyes. Do not breathe vapour. For personal protection, see section 8.

6.2. Environmental precautions
Environmental precautionary measures Avoid discharge into drains, water courses or onto the ground.

6.3. Methods and material for containment and cleaning up
Cleaning method Dam and absorb spillages with sand, earth or other non-combustible material. Collect spillage in containers, seal securely and deliver for disposal according to local regulations.

6.4. Reference to other sections
Other instructions Information regarding exposure / personal protection and disposal, see section 8 and 13.

SECTION 7: Handling and storage

7.1. Precautions for safe handling
Handling Keep away from heat, sparks and open flame. Take precautionary measures against static discharges. Mechanical ventilation may be required.

Protective Safety Measures
Advice on general occupational hygiene Provide easy access to water supply and eye wash facilities.

7.2. Conditions for safe storage, including any incompatibilities
Storage Keep away from heat, sparks and open flame. Ground container and transfer equipment to eliminate static electric sparks. Store in a cool and well-ventilated place.

7.3. Specific end use(s)
Specific use(s) Not entered.

SECTION 8: Exposure controls/personal protection
8.1. Control parameters
Other Information about threshold limit values

Ammoniak (CAS-nr: 7664-41-7):
Nivågränsvärde (NGV): 20 ppm, 14 mg/m³
Takgränsvärde (TGV): 50 ppm, 35 mg/m³
Källa: AFS 2011-18 - Hygieniska gränsvärden
DNEL / PNEC values represent ammonia, the major component of this mixture.

<table>
<thead>
<tr>
<th>DNEL / PNEC</th>
<th>Method of testing</th>
<th>Contents</th>
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</thead>
<tbody>
<tr>
<td>DNEL</td>
<td>Group: Worker</td>
<td>Inhalation</td>
</tr>
<tr>
<td></td>
<td>Exposure route:</td>
<td>Short term (acute)</td>
</tr>
<tr>
<td></td>
<td>Type of effect:</td>
<td>Systemic effect</td>
</tr>
<tr>
<td></td>
<td>Value: 47.6 mg/m³</td>
<td></td>
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<tr>
<td>DNEL</td>
<td>Group: Consumer</td>
<td>Inhalation</td>
</tr>
<tr>
<td></td>
<td>Exposure route:</td>
<td>Short term (acute)</td>
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<tr>
<td></td>
<td>Type of effect:</td>
<td>Systemic effect</td>
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<tr>
<td></td>
<td>Value: 23.8 mg/m³</td>
<td></td>
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<tr>
<td>DNEL</td>
<td>Group: Consumer</td>
<td>Inhalation</td>
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<tr>
<td></td>
<td>Exposure route:</td>
<td>Long term (repeated)</td>
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<tr>
<td></td>
<td>Type of effect:</td>
<td>Local effect</td>
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<td>Value: 2.8 mg/m³</td>
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<td>Type of effect:</td>
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<tr>
<td></td>
<td>Value: 6.8 mg/kg</td>
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<td>DNEL</td>
<td>Group: Consumer</td>
<td>Oral</td>
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<tr>
<td></td>
<td>Exposure route:</td>
<td>Long term (repeated)</td>
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<td>Type of effect:</td>
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<td>Value: 6.8 mg/kg</td>
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<td>Group: Worker</td>
<td>Inhalation</td>
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<td></td>
<td>Exposure route:</td>
<td>Short term (acute)</td>
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</tr>
<tr>
<td></td>
<td>Value: 36 mg/m³</td>
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<tr>
<td>DNEL</td>
<td>Group: Worker</td>
<td>Dermal</td>
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<td>Exposure route:</td>
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<tr>
<td></td>
<td>Type of effect:</td>
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<tr>
<td></td>
<td>Value: 68 mg/kg</td>
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</tr>
<tr>
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<td>Exposure route:</td>
<td>Long term (repeated)</td>
</tr>
<tr>
<td></td>
<td>Type of effect:</td>
<td>Systemic effect</td>
</tr>
<tr>
<td></td>
<td>Value: 6.8 mg/kg</td>
<td></td>
</tr>
<tr>
<td>DNEL</td>
<td>Group: Consumer</td>
<td>Dermal</td>
</tr>
<tr>
<td></td>
<td>Exposure route:</td>
<td></td>
</tr>
</tbody>
</table>
Exposure frequency: Short term (acute)
Type of effect: Systemic effect
Value: 68 mg/kg

DNEL
Group: Consumer
Exposure route: Dermal
Exposure frequency: Long term (repeated)
Type of effect: Systemic effect
Value: 68 mg/kg

DNEL
Group: Worker
Exposure route: Inhalation
Exposure frequency: Long term (repeated)
Type of effect: Local effect
Value: 14 mg/m3

DNEL
Group: Worker
Exposure route: Inhalation
Exposure frequency: Long term (repeated)
Type of effect: Systemic effect
Value: 47.6 mg/m3

DNEL
Group: Consumer
Exposure route: Inhalation
Exposure frequency: Short term (acute)
Type of effect: Local effect
Value: 7.2 mg/m3

PNEC
Exposure route: Water
Value: 0.0011 mg/l
Remarks: marine water

PNEC
Exposure route: Water
Value: 0.0011 mg/l
Remarks: fresh water

PNEC
Exposure route: Water
Value: 0.0068 mg/l
Remarks: Tillfälliga utsläpp (intermittent releases)

8.2. Exposure controls
Occupational exposure limits
Provide adequate ventilation. Observe Occupational Exposure Limits and
minimise the risk of inhalation of vapours. Protective gloves and goggles are
recommended. Provide eyewash, quick drench.

Safety signs

Respiratory protection
Respiratory protection must be used if air contamination exceeds acceptable
level. Use respiratory equipment with gas filter, type K.

Hand protection
Use protective gloves. Chemical resistant gloves required for prolonged or
repeated contact. Gloves of nitrile rubber, PVA or Viton are recommended.

Eye / face protection
Use safety goggles or face shield in case of splash risk.

Skin protection
Wear appropriate clothing to prevent any possibility of skin contact.

Hygiene / Environmental
Wash hands after contact.
SECTION 9: Physical and chemical properties

9.1. Information on basic physical and chemical properties

<table>
<thead>
<tr>
<th>Physical state</th>
<th>Fluid.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Colour</td>
<td>Colourless.</td>
</tr>
<tr>
<td>Odour</td>
<td>Ammonia. Slightly pungent odour.</td>
</tr>
<tr>
<td>Comments, pH (as supplied)</td>
<td>Basisk. (Alkaline.)</td>
</tr>
<tr>
<td>Comments, Melting point / melting range</td>
<td>Not known.</td>
</tr>
<tr>
<td>Boiling point / boiling range</td>
<td>Value: 38 °C</td>
</tr>
<tr>
<td>Comments, Flash point</td>
<td>Ej tillämpligt. (Not applicabe.)</td>
</tr>
<tr>
<td>Explosion limit</td>
<td>Value: 15-28 %</td>
</tr>
<tr>
<td>Vapour pressure</td>
<td>Value: 48 kPa</td>
</tr>
<tr>
<td>Vapour density</td>
<td>Value: 2.55</td>
</tr>
<tr>
<td>Specific gravity</td>
<td>Value: 907 kg/m³</td>
</tr>
<tr>
<td>Solubility in water</td>
<td>Löslig i vatten. (Soluble in water).</td>
</tr>
<tr>
<td>Partition coefficient: n-octanol/water</td>
<td>Value: -1.14</td>
</tr>
<tr>
<td>Spontaneous combustability</td>
<td>Value: 650 °C</td>
</tr>
<tr>
<td>Viscosity</td>
<td>Value: 3.102 mPas</td>
</tr>
</tbody>
</table>

9.2. Other information

SECTION 10: Stability and reactivity

10.1. Reactivity

Reactivity: In reaction with certain substances (see Section 10.3) a risk of explosion occurs. Evaporate at room temperature. The gas is chemically active.

10.2. Chemical stability

Stability: Stable under the prescribed storage conditions. The solution, however, is a perishable where the concentration of ammonia decreases over time as ammonia gas departs.

10.3. Possibility of hazardous reactions

Possibility of hazardous reactions: Solvent vapors may form unstable or explosive compounds with: acetaldehyde, chlorosilicane, ethylene oxide, fluorine, hydrogen bromide, hypochlorites, iodine, nitric acid, nitrozinl chloride, phosphorus, hydrogen phosphate picric acid, arsenic hydrogen, antimony hydride, sodium, sulphuric oxide, silver, Mercury, lead. Can react violently if in Contact with strong acids or nitrogen oxides.

10.4. Conditions to avoid

Conditions to avoid: Avoid heat, flames and other sources of ignition.

10.5. Incompatible materials

Materials to avoid: Avoid contact with oxidising agents (e.g. nitric acid, peroxides and chromates). Strong acids. Will corrode copper, zinc, aluminium and their alloys.

10.6. Hazardous decomposition products

Hazardous decomposition products: Fire creates: Nitrous gases (NOx).

SECTION 11: Toxicological information

11.1. Information on toxicological effects

Toxicological Information:

Other toxicological data: Acute Toxicity (Oral LD50): mg/kg (oral rat) 350
Potential acute effects

Inhalation
Gas or vapour may irritate respiratory system. High concentrations may cause severe lung damage. Ikke klassificerad som aspirationstoxisk (Not classified as asp. tox.)

Skin contact
Corrosive. Prolonged contact causes serious tissue damage.

Eye contact
Strongly corrosive. Causes severe burns and serious eye damage. Immediate first aid is imperative.

Ingestion
Highly Corrosive. May cause burns in mucous membranes, throat, oesophagus and stomach.

Delayed effects / repeated exposure

Sensitisation
Not known.

Chronic effects
Not known.

Carcinogenic, Mutagenic or Reprotoxic

Carcinogenicity
Not known.

Mutagenicity
Not known.

Teratogenic properties
Not known.

Reproductive toxicity
Not known.

SECTION 12: Ecological information

12.1. Toxicity

Acute aquatic, fish
Value: 0.89 mg/l
Method of testing: LC50
Fish, species: Onchorynchus mykiss
Duration: 96h

Acute aquatic, algae
Value: 7200 mg/l
Method of testing: EC50
Algae, species: Chlorella vulgaris
Duration: 18 d
Test reference: Freshwater, static

Acute aquatic, Daphnia
Value: 101 mg/l
Method of testing: EC50
Daphnia, species: Daphnia magna
Duration: 48h
Test reference: Freshwater static, equivalent to ASTM E729-80.

Other ecotoxicological information, fish
Chronic fish toxicity, Onchorynchus mykiss, 73 d, LOEC: 0.022 mg/l

Other ecotoxicological information, crustaceans
Chronic daphnia toxicity, Daphnia magna, 96 h, NOEC: 0.79 mg/l.
Freshwater flow-through equivalent or similar to EPA OPPTS 850.1300 (Daphnid Chronic Toxicity Test)

12.2. Persistence and degradability

Degradation half life
Lätt biologiskt nedbrytbar. (Readily biodegradable.)

12.3. Bioaccumulative potential

Bioaccumulative potential
Will not bio-accumulate.

12.4. Mobility in soil

Mobility
The product is water soluble and may spread in water systems.

12.5. Results of PBT and vPvB assessment

PBT assessment results
This substance is not classified as PBT or vPvB.

12.6. Other adverse effects

Other adverse effects / Remarks
None known.
SECTION 13: Disposal considerations

13.1. Waste treatment methods
Specify the appropriate methods of disposal
Confirm disposal procedures with environmental engineer and local regulations.
Absorb in vermiculite or dry sand and dispose of at a licenced hazardous waste collection point.
Product classified as hazardous waste
Yes
Packaging classified as hazardous waste
Yes

SECTION 14: Transport information

14.1. UN number
ADR 2672
RID 2672
IMDG 2672
ICAO/IATA 2672

14.2. UN proper shipping name
ADR AMMONIA SOLUTION
RID AMMONIA SOLUTION
IMDG AMMONIA SOLUTION
ICAO/IATA AMMONIA SOLUTION

14.3. Transport hazard class(es)
ADR 8
Hazard no. 80
RID 8
ADN 33
IMDG 8
ICAO/IATA 8
Comment 3 (D/E)

14.4. Packing group
ADR III
RID III
IMDG III
ICAO/IATA III

14.5. Environmental hazards
Comment Not relevant.

14.6. Special precautions for user
EmS F-A, S-B

14.7. Transport in bulk according to Annex II of MARPOL 73/78 and the IBC Code

SECTION 15: Regulatory information

15.1. Safety, health and environmental regulations/legislation specific for the substance or mixture
Other Label Information

Legislation and regulations
Dangerous Substance Directive 67/548/EEC.
15.2. Chemical safety assessment

SECTION 16: Other information

**Hazard symbol**

<table>
<thead>
<tr>
<th>R-phrases</th>
<th>S-phrases</th>
</tr>
</thead>
<tbody>
<tr>
<td>R34 Causes burns.</td>
<td>S2 Keep out of the reach of children.</td>
</tr>
<tr>
<td>R50 Very toxic to aquatic organisms.</td>
<td>S7 Keep container tightly closed.</td>
</tr>
<tr>
<td></td>
<td>S9 Keep container in a well-ventilated place.</td>
</tr>
<tr>
<td></td>
<td>S26 In case of contact with eyes, rinse immediately with plenty of water and seek medical advice.</td>
</tr>
<tr>
<td></td>
<td>S36/37/39 Wear suitable protective clothing, gloves and eye/face protection.</td>
</tr>
<tr>
<td></td>
<td>S45 In case of accident or if you feel unwell, seek medical advice immediately (show the label where possible).</td>
</tr>
<tr>
<td></td>
<td>S46 If swallowed, seek medical advice immediately and show this container or label.</td>
</tr>
</tbody>
</table>

**Classification according to Regulation (EC) No 1272/2008 [CLP/GHS]**

| List of relevant R-phrases (under headings 2 and 3). | Skin Corr 1B; H314; |
| List of relevant H-phrases (Section 2 and 3). | STOT SE3; H335; |

**Responsible for safety data sheet**

Fred Holmberg & Co AB